

ESTU 20 MV Tandem Accelerator



The WNSL Facility is centered on the  
ESTU Tandem Van de Graaff generator

- Max Terminal Voltage ~20 MV
- Ion beams from H to U (including He)
- Typical beam energies ~5 – 10 MeV/A (protons up to ~40 MeV)

•A complete list of beams and typical currents is available on the WNSL web-site  
<http://wnsl.physics.yale.edu/estu/>

•The accelerator feeds nine beam lines hosting a wide variety of state-of-the-art experimental apparatus

•Beam available < 4,500 hours per year



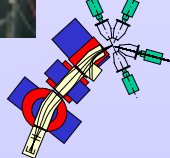
Test Negative Ion Injector

Ion Sources:

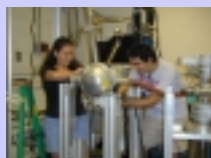
- Middleton-type Sputter
- Duoplasmatron



SASSYER and some of the nuclear structure group



The ICE and YRAST Balls

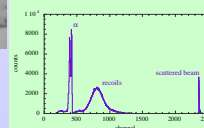


Solar Cells

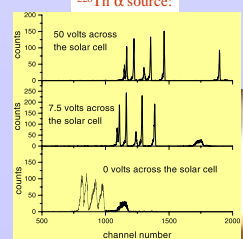
- small (1 cm<sup>2</sup>)
- rugged
- low cost
- reasonable resolution
- charged particle detectors



Heavy-ion recoils (25 MeV <sup>209</sup>Rn) from SASSYER with subsequent alpha decay



<sup>228</sup>Th α source:



30 cell array at SASSYER focal plane



#### Major Experimental Apparatus Available at the WNSL

- YRAST Ball gamma-ray spectrometer**
  - >3 % absolute efficiency Ge-detector array
  - 9 Segmented clover and 19 coaxial detectors
  - Largest university-based Ge detector array
- SASSYER**
  - High transmission efficiency gas filled magnetic separator coupled to the YRAST Ball gamma-ray array
  - Very clean channel selection device
  - Focal plane detectors include arrays of solar cells and DSSD detectors
- SPEEDY and the NYPD**
  - The New Yale Plunger Device is a state-of-the-art recoil distance plunger designed to measure short nuclear lifetimes (picoseconds to nanoseconds).
  - The SPEEDY frame accommodates up to nine clover Ge detectors
- Moving Tape Collector for β-decay and mass studies**
  - For beta half-lives > 0.5 s.
  - Fast Electronic Scintillation Timing (FEST) ... picosecond half-lives
  - Gamma and beta measurements
- g-factor measurements (Rutgers University)**
  - Transient field method
- SAMMY**
  - 7 T superconducting solenoid magnet for g-factor and perturbed angular correlation studies
- Edge Split pole magnetic spectrometer**
  - Astrophysics measurements
  - The YLSA lamp shade array
- ICE Ball**
  - An array of six mini-orange electron spectrometers designed (by J. Saladin) to measure Internal Conversion coefficients
- Variety of charged particle detectors including arrays of solar cells for heavy ion and alpha particle detection.**
- General Purpose Scattering Chamber**
- Test Ion-source for new beam development**

#### Faculty/Staff

##### Active in the In-house Program

##### Nuclear Structure Physics

- Prof. R. Casten (Laboratory Director)
- Prof. C. Beausang
- Dr. N.V. Zamfir
- Dr. J. Ressler
- Dr. H. Amro
- 4 Graduate Students
- 4 Undergraduate Students

##### Nuclear Astrophysics

- Prof. P. Parker
- Dr. J. Caggiano
- 3 Graduate students
- 2 Undergraduate students

##### Accelerator operations

- Jeff Ashenfelter (Operations)
- Tom Barker (Electronics)
- John Barris (Computers)
- Craig Miller (Mechanist)
- 5 Technicians

#### Wright Nuclear Structure Laboratory

Yale University

New Haven

Connecticut

#### Contact Persons

##### Scientific programs

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